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RESECTION AT THE HIP-JOINT

FOR

MORBUS COXARIUS.

ENCHONDROMA,

OR

CARTILAGINOUS TUMORS.

BY

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ARTICULAR AMPUTATION

AT THE

HIP-JOINT.

MICHAEL TIFFANY, seven years of age, has been suffering from Morbus Coxarius of the left hip for one year, the result of a fall. An abcess formed, which opened spontaneously, about the sixth month, on the outer side of the thigh, at the juncture of its middle and upper third. The pain is so severe that he is obliged to support the limb between his hands, a great part of the twenty-four hours, never sleeping, except while holding it in that manner; very much emaciated, but little appetite, and that capricious, steadily sinking from the exhaustion of the discharge and constitutional irritation. After frankly explaining everything to his mother, she promptly consented to place the child in our hands for an operation—and one of my greatest pleasures in treating the case, has been to see her unwavering confidence and patient devotion to the boy; watching him night and day with the ceaseless constancy that betokens a true and faithful parent. To her care I attribute a large share of the successful result—as more depends upon the after-treatment and attention than on the operation itself.

October 16th, 1859.—Operated with Drs. Alex. H. Stevens, Hosack, Gerscheid, and A. L. Sands, to advise and assist me.

The patient being under the influence of chloroform, cut down upon the trochanter major—after separating the gluteal muscles from their insertion, and dividing the capsular ligament,—the ligamentum teres having been destroyed by the disease,—the head of the bone was easily thrown out of the cavity of the acetabulum, by flexing and adducting the limb. Finding that

the head of the os femoris was the only bone diseased, it was removed by sawing through the neck, at its junction with the shaft. The innominatum perfectly healthy. A probe could be passed by the external opening in the integuments, through the abcess, and a small perforation in the inferior portion of the capsular ligament, into the cavity of the acetabulum, proving that the pus had escaped from the joint through, this, the only opening in the capsular ligament.

October 17th.—Very comfortable, has slept well, and suffers less than he has for months. To have ten drops of the muriated Tincture of Iron three times daily, Cod Liver Oil and nourishing diet.

February 20th, 1860.—The patient has progressed favorably, without one really bad symptom to embarrass his recovery ; external wound closed, appetite good, strength improving, and has grown quite fat. Can rotate, flex and extend the thigh upon the Pelvis. The limb has been kept quiet and extension continued during the whole time by means, either of the double inclined plane, or the straight splint.

April 1st.—Allowed to go about on crutches.

May 16th.—Seven months after the operation. Leg one inch shorter than the other, but can easily be drawn down to the same length, walks very well without crutches, but desired to continue the use of one. The swelling of the limb having subsided, there is apparent atrophy of the muscles of the thigh, his lameness evidently disappearing as they are developed by use.

The pathology of diseases of the joints was almost a terra incognita full of useful and important indications, but of little advantage to the Practitioner, until the investigations of Sir Benjamin Brodie brought them to light, and presented them to the world of medicine in a practical form.

In the introduction to his work on diseases of the joints, he says—"I was induced to hope, that if it were possible to improve our pathological knowledge of the diseases to which I

have alluded, this might lead, not indeed to the discovery of new methods of treatment, but to a more judicious and scientific application of those which are already known, and a consequent improvement of chirurgical practice." Although, from the knowledge acquired by his investigations, he could see how much was yet to be learned in the treatment of diseases of the joints and their surrounding tissues, yet, he did go further, than to simply lay the foundation of our pathological knowledge ; by either indicating or improving almost every treatment, to be gradually advanced towards perfection, as experiments and experience accumulated facts. Take, for instance, the treatment of this very disease of the hip-joint, in which improvement has so steadily advanced, that it seems now almost perfected.

Dr. PHYSICK of Philadelphia, was very successful in his treatment of the disease, by applying leeches in the inflammatory stage, followed by a calomel purge, after which he commenced a coarse of steady purging with pulvis purgans ; he considered this drain, and the consequent irritation, as superior to issues, setons, or other external remedies ; after pursuing this plan for a few weeks, and accustoming the patient to the bed, he applied a splint of one half the diameter of the leg, extending from the middle of the thorax to the malleolus ; it is carved so as to adapt itself accurately to the irregularities of the limb, and after being well padded, is secured by rollers round the Pelvis, thigh and leg. The time required for a cure, varying from six months to two years.

Dr. WM. HARRIS, in 1839, recommended the use of Hagadorn's apparatus, modified by Gibson, as accomplishing the double purpose of keeping up continued extension, at the same time, the limb being kept perfectly quiet, to facilitate ligamentous union, or ankylosis, without shortening.

BRODIE, in his revised Edition of Diseases of the Joints, published in 1843, at page 96, advises that "the patient should be confined to his bed or couch, being never allowed to move from

it, on any occasion. * * * At a later period when, in consequence of the extensive destruction of the articulation, the muscles begin to cause a shortening or retraction of the limb. I have found great advantage to arise from the constant application of a moderate extending force, operating in such a manner as to counteract the action of the muscles ; for this purpose, an upright piece of wood may be fixed to the foot of the bedstead, opposite the diseased limb, having a pully at the upper part—a bandage may be placed round the thigh, above the condyle, with a cord attached to it, passing over the pulley and supporting a small weight at its other extremity." He thinks extension will lessen the shortening of the limb, at the same time diminishing very much the sufferings of the patient, which were aggravated by this shortening of the limb. At page 143, in describing the treatment of a diseased knee-joint, he directed "that an instrument should be applied at the back part of the limb, attached to the thigh and leg, so as to give much support to the joint, at the same time that it was furnished with a screw, by means of which, the leg might be very cautiously and gradually extended. In a fortnight after it was first applied, the little boy was able to walk across the room without difficulty, and altogether, it was so convenient that he was allowed to wear it during the night, by his express desire."

Dr. ALDEN MARCH, in a paper upon coxalgia, published in the "Transactions of the American Medical Association of 1847, vol. 6"—describes a splint, and represents the same by a drawing, in which the foot is attached to a foot piece and the counter-extension is accomplished by means of "a Perineal belt or strap," the splint being constructed for the purpose of avoiding pressure upon the trochanter major, and thus relieving the acetabulum from the pressure of the head of the os femoris.

In 1855, so far as I can learn, Dr. H. M. Davis was the first to suggest a splint, by the use of which, the patient suffering from disease of the hip-joint, is enabled to walk about without

irritation to the articulating surfaces. To this splint, Dr. Sayre adjusted a cog-wheel and ratchet, by means of which the extension may be more conveniently increased, than in the instrument as used by Dr. Davis. As it is necessary that this instrument should be worn constantly for some months to accomplish a cure, the knee-joint necessarily becomes very rigid. I have lately applied a modification of the same instrument to a patient suffering from hip-joint disease, in its early stage, allowing free movement to the knee-joint. Before its application, the little girl could hardly bear the weight of the body upon the limb, and was always awaked two or three times during the night, by the pain ; she now plays about with the other children all day, and sleeps as well as ever at night ; never removing the instrument, except that it may be readjusted. Nothing can more clearly demonstrate the gradual and progressive improvement of our noble profession ; step by step, doubts cleared up, and uncertainties made certain.

PHYSICK recognized the necessity of rest and avoided issues. Harris perceived the advantage of extension combined with rest. Brodie dipped a little deeper, and found that extension alone would relieve the pain, while it remedied the shortening—but he only thought of it in the advanced stage of the disease. March discovered that a splint, by which the counter-extension was accomplished through a perineal strap, was the most successful apparatus, and I think the traction of this strap, pressing the soft parts between the shaft of the os femoris and the pelvis, as it were wedging them apart, did more towards relieving the acetabulum from the irritation of the head of the bone, than the peculiar construction of the splint ; at all events, this apparatus was an important step forward.

It was reserved for Dr. Davis to reach the point which his predecessors were so steadily approaching *i.e.* an instrument by which, in the early stages of the disease (and at other periods too), the motion of the joint is preserved, the pressure relieved, and the patient enabled to take exercise.

Until the investigations of Mr. Brodie, earlier Surgeons entertained vague and uncertain opinions with reference to this class of diseases, applying the same term without discrimination to affections, which are now known to be entirely different in their character and consequence ; white swelling being the most usual expression, (sometimes varied with scrophulous caries) by which to designate the numerous changes that take place in these important structures. Modern pathology has thrown much light upon this important subject, it has been the basis of a more thorough classification, followed by more accurate investigation, resulting in reliable diagnosis, which is the very keystone to successful treatment.

The general anatomy of joints is so simple and easily understood that it requires but a passing notice ; enclosed in a capsule, are bones, tendons, cartilages, ligaments, synovial membrane and glands. Where we find parts so different from each other, both in structure and in functions, within a limited space, continually called into action, we must expect to find a variety of diseases, varying from the mildest to the gravest form.

There is still great obscurity as to the pathology of disease of the hip-joint in its early stage, upon which it is to be hoped much light will be thrown by the happy success of recent surgical interference.

Although this disease may appear at any period of life, it most frequently attacks children, between the ages of three and sixteen years. Mr. Brodie saw it in a woman at sixty years of age, and a child at twelve months. It is much more frequent in the male than the female—out of 131 cases, of which I have seen or found record, 96 were males, 35 females, and it has a decided preference for the left hip.

In early life, it usually appears as ulceration of the cartilages and ligaments, scrofulous caries of the os femoris, or a combination of both, as in the case before us. By referring to the plate, which represents the appearance of the head of the bone at the

time of its removal, it will be perceived that there is a small patch of the cartilage of incrustation, the size of a three-cent piece still remaining, adherent to the surface of the bone, the disease having completely removed the ligamentum teres. The head of the bone presents some important indications, bearing, I trust, upon the period at which the operation should be performed ; the whole *caput femoris* is involved in the disease, the outer denser portion still maintaining its shape, surrounding the inner cancellous structure, the latter being detached and movable, resembling a sequestrum contained within its involucrum. Here the head and neck of the bone were irrecoverably involved in the disease, the shaft of the *femur* perfectly healthy, and the bones of the *Pelvis* remaining unassailed by the disease. Then, why did we not hit upon the most fortunate moment for the operation ?

The joint had lost all its peculiar characters, which have so long deterred Surgeons from cutting into it, there was no diseased action in the bone nearest in communication with the most vital organs—but confined to an extent of tissue, which, being removed, leaves a perfectly healthy shaft—its upper extremity smooth and round, protected by its natural coverings of periosteum and soft tissues. I believe there are no symptoms yet recorded, by which we can determine when the disease has reached this stage—and I do think that greater success will attend the operation when performed before, than after this point of its progress. Until now, there has been no rough, sharp points of bone, by their friction, causing irritation, and rousing diseased action in the structures with which they come in contact—whereas, so soon as the head of the bone breaks down, sharp processes, the remains of the neck, project from the shaft, as I have seen in two patients since this operation. Such a condition of things will continue for a long time ; in one patient the disease had existed for four years, the *innominatum* was extensively involved, as was the upper end of the *os femoris* to an

inch below the neck, yet two or three sharp points still remained standing at right angles with the shaft, in every movement of the limb causing suffering. In the other little victim, the disease was only of six months standing, an abscess had formed, but without an external opening as yet ; upon exposing the cavity of the joint, there were the merciless causes of irritation projecting from the shaft of the bone.

The specimens of diseased joints which Sir B. Brodie was enabled to examine, were mostly those where the disease had reached an advanced stage ; it falls to the lot of the present generation, to investigate the pathology of those same diseases in its earlier and more important periods.

After the resection of bones by White and Park, in the latter part of the eighteenth century, without any good reason, such operations were almost entirely abandoned, until within a few years ; those upon the hip-joint being particularly resisted, even to the point of never opening those immense abscesses about the hip, let the pus burrow where it may—recently these operations have been in some cases so successful, that their practicability must now be thoroughly tested, aided by the additional light thrown upon the recuperative powers of nature, as exemplified in the experiments of Wagner and others.

The important points to determine, are, the possibility of wholly removing the diseased bone ; if accomplished, will nature come to the rescue with sufficient energy to save the limb ; what will be the degree of usefulness after recovery and the comparative mortality as compared with amputation. Upon all these points, except the last, I think the majority of Surgeons are disposed to favor resection, as to the last, we are wanting in statistics, for which we must patiently wait, trusting that we may soon be enabled to designate the class of diseases, and their concomitants, to be benefited by articular amputation ; or at all events, to avoid such a wholesale resort to the knife as to bring the operation into disrepute. This point attained our task is yet unfin-

ished, the method of operating is to be improved ; and above all things attention to, and a thorough investigation of the healing process after the operation requires our careful study, for upon the after-treatment depends the success, more than almost any other class of operations in surgery.

Experiments and post mortem examinations have very clearly demonstrated how much nature will do for the surgeon, and how imperative nature is in her demand that the surgeon shall do all she asks of him. If in removing the diseased bone, he will carefully preserve the periosteum and adjacent fibrous tissue, she will often supply a perfect bone in the place of the one removed, as in the case of Meyer of Zurich who extirpated the clavicle on account of caries, on a man thirty-one years of age—the patient soon obtained perfectly good use of the arm. In the situation of the extirpated bone a mass of new bone, of the form of a normal clavicle, was plainly to be felt. The patient died about five years after the operation. At the dissection there was found between the facet of the clavicle on the sternum and the acromion, a fibrous, almost cartilaginous band, on which the lower edge of the newly formed bone was supported, and with which it seemed to be continuous in some places.

RACORD has observed a case of regeneration of the whole of the humerus, together with its upper articular end , the new bone being about eight and a half inches in length and about an inch and a quarter in breadth. At the upper end of this there was an articular surface corresponding perfectly to the glenoid cavity, and closely united to that cavity by a ligament attached all round it.

Removal of the substance of bones, is an operation so well established and so generally resorted to in certain cases that it would be foreign to the purpose, and our subject to enter into its discussion here, but I cannot resist introducing references to a few cases, where either the whole bone, or a greater part of it, to a point so near the joint as to encroach upon the parts involved in its movements were successfully removed. In the

New Orleans Medical Register is reported an operation by Dr. Compton, where he removed both radius and ulna from the arm of a boy fifteen years of age, who was injured by an anchor being suddenly let down. The chain caught the arm and produced a fracture of the inferior maxillary and humerus, and a compound comminuted fracture of the radius and ulna.

Having dissected out both bones and disarticulated them at the elbow, he removed them entire with the exception of a portion of the lower end of the radius. A great portion of the periosteum was detached from the bones and left in the wound. While healing several abscesses formed in the arm, from which a number of spicula of bone were discharged when they closed, and the arm immediately assumed a healthy condition. The arm is two or three inches shorter than the other and perfectly firm. It remains at a right angle to the humerus, and can be flexed and extended so that the hand moves through eight or ten degrees of a circle. He has entire use of the hand, he can open and shut it and grasp objects quite firmly.

In "Dr. Williamson's Notes on the wounded from the Mutiny in India," (page 109,) will be found the account and representation of a case in which he excised the entire ulna, an inch and a half of the extremity of the humerus, and also the head and neck of the radius, on account of disease following diffuse inflammation. The wound healed by first intention. Four months after the operation the man could bend his forearm, raise his hand behind his head, and lift a twenty-eight pound weight from the ground ; he could also pronate and supinate the hand ; there was no ankylosis of the wrist-joint, and he could use his fingers well.

Maisonneuve in May, 1856, "resected the whole of the lower jaw on account of a fibrous tumor. The wound united by first intention. Soon after the operation (when the case was reported,) a firm tissue was deposited in the place of the resected bone, in which, as the periosteum had been spared, it was hoped that bone would be deposited."

The reparative powers of nature are beautifully exemplified in these operations on the lower jaw, at the present day of very frequent occurrence, owing to the necessary exposure of workers in match factories, where they are continually exposed to the fumes of Phosphorus. The victim of the disease almost invariably dates its commencement, from the extraction of a tooth, when returning immediately to his work in the midst of the Phosphorus, he is surprised to find that the gum never recovers its natural condition, but on the contrary, the disease usually extends with great rapidity, until it involves the whole jaw bone, unless the diseased portion is thoroughly removed. These dangers are so well understood in some factories, that upon the extraction of a tooth, the employee is positively forbidden to approach it, until the parts have recovered their natural state.

There have as yet, been but very limited opportunities of investigating the post mortem condition of the parts, after articular amputation at the hip joint.

Mr. Wagner, of Berlin, in his carefully compiled article upon "Resection and Extirpation of Bones," has reported the little that we have upon this point, portions of which I take the liberty of introducing here, with a ready and cheerful acknowledgment, that I shall often make use of the valuable suggestions and experiments so happily presented to the public, through his skillful management of the subject.

REID relates a case where the head and neck of the os femoris had separated spontaneously after an abscess in the joint, in a boy of fifteen, being extracted through an incision. After the death of the patient which was the result of Bright's disease, a year afterwards, a new joint was found, two rounded processes having been formed upon the remains of the neck of the femur, the upper of which was connected with a bony prominence above the acetabulum, and the lower (situated immediately in front of the small trochanter) with the original articular cavity by firm

fibrous tissue, in such a way as to admit of motion. The motion of the limb was limited.

In Texter's case, a man fifty-four years of age, suffering from caries of the upper end of the bone for which the head and neck of the femur, together with trochanter major were removed. The wound united with the exception of a small part, when the patient died fifty-three days after the operation. At the upper and inner side of the femur, a depression resembling a neck was formed. The acetabulum which was partly covered by granulations was healthy: at separate points of it, there was also found a deposit of new bone, which however separated again on maceration of the pelvis. The upper end of the femur rested against the ischium at the posterior edge of acetabulum, so that a depression had been formed in this bone, one inch and a half in length, half an inch broad, and two lines in depth.

WHITE resected the upper end of the femur, just below the trochanter minor, on a boy thirteen years old. In one year, recovery was so perfect that the boy could execute flexion, extension, and in fact every other motion of the joint, except rotation outwards—he died within five or twelve years after the operation. The ileum and the remains of the femur were found thin and light. The thigh bone rested with its upper extremity against the hinder part of the acetabulum, and was united to it, and to the neighboring portion of the os-ili, by a firm ligamentous tissue, which appeared to belong, partly to the remains of the articular capsule, which had been left between the bones. A muscle was inserted into this tissue and into the upper portion of the femur. Nothing more is added in the description of the preparation.

Mr. Buchanan removed the head of the femur for caries, in a man forty-one years of age. The patient died three months after the operation from dysentery. Upon examination after death, the cut surface of the neck of the femur, and great trochanter were perfectly healthy, and covered by a cartilage of

incerustation. The circumference of the acetabulum, from which the edges had been removed, was studded with spiculae of new bone, showing the progress that had been made towards a cure. The acetabulum was filled up with granulations.

This operation upon the shoulder-joint, has been attended with quite as good results as in the hip, and all dissections have tended to substantiate the same train of facts.

Wagner reports five cases of examination after death, the patients having survived the operation from six months to nineteen years. In all these cases, the patients recovered with very useful arms, in one, operated upon by Mr. Syme, the woman could sew, knit, wash and raise a full pitcher of water ; he found in both the patients who died, one six months and the other eleven years after the operation, the head of the humerus rounded off, and united by a firm ligamentous tissue to the shoulder-blade. In Mr. Texter's case of the thatcher, the man was enabled to resume his occupation, although abduction of the arm was imperfect. The deltoid muscle was found remarkably thin eleven years after the operation, and firmly consolidated to the newly formed capsule, and to the infra-spinatus muscle, which is usual after resection of the shoulder.* He gives two cases where there was formation of new bone, in the one, appearing as a long styloid prominence, resembling that process of the ulna, in the other, a mass covering the upper end of the humerus, in the form of an uneven tubercle half an inch in length, one eminence of which, served for the insertion of the long head of the biceps, the tendon of which must have been divided ; the other articulated with a small depressed portion of the glenoid cavity of the scapula, which was covered with cartilages. In the thatcher, a patient who died nineteen years after the operation, he found what he calls a meniscus, in one case freely movable, between the newly formed mass of bone and the glenoid cavity ; being united by numerous bands to the acromion, cora-

* Reid and Wagner.

coid process, subclavius and pectoral muscles, and the humerus. In only the first case a capsule appears to have been formed, this meniscus being united to it, the articular capsule was united with a peculiar fibroid tissue, to about the upper fourth of the humerus. It embraced the bone firmly, and was united to all the parts in the region of the joint, the inner surface being rough and difficult to separate from the bone.

Three cases of dissection, are reported by Mr. Holmes.

The first was operated upon by Herr Reid for caries of the head of the bone with acute pain in the joint, examined one year after the operation, one long incision had been made, and the tendon of the biceps was spared. The patient was in a bad state of health, suffering from the effects of empyema, &c. The scapula was found superficially ulcerated ; the wound healed except two small fistulae, and the functions of the arm were perfect, except abduction. He died of lumbar abscess, accompanied by tubercular disease in other parts. Dissection of the shoulder showed the ends of both bones enclosed in a capsule, which was lined by a membrane, resembling mucous membrane, and covered by a viscid secretion. This capsule was closed, except at two points where it communicated with the above mentioned fistulae. Its walls were formed in part by the remains of the old articular capsule, but principally by the muscles surrounding the joint. The latter were more or less fettily degenerated, and the supra and infra-spinatus were also infiltrated with pus from the fistulae. The long tendon of the biceps was traced upwards. It was free up to the resected end of the humerus, here it was firmly united to that bone, and beyond this point a deposit of bone was found, it corresponding to a bony swelling on the inner side of the resected humerus. Above this it was inseparably united to the capsule, and beyond that again could be traced in the form of a band, a quarter of an inch in breadth, bridging over the interval between the capsule and the remains of the glenoid cavity, which was affected with caries. The end of the humerus was a

little enlarged, and rounded off; on its inner side, was a crest of bone resembling an exostosis. The thicker parts of the scapula and especially the acromion were swollen and very porous. Lamellated bony deposits were found in the supra-pinous fossa.

Mr. Hutchinson excised the head and about a third of the shaft of the humerus, on account of a tumor described as of the myeloid variety. The tumor recurred (being then of a distinctly cancerous nature) in the wound, and in other parts of the body, and the patient died five months after the operation. The shaft of the bone was itself healthy, and was united to the lower edge of the glenoid cavity by a thick ligamentous band, so strong that the bones could not be separated by any moderate force. This union permitted of free motion in all directions. Springing from the periosteum of the humerus at the point of section, surrounding the bone and the ligament, uniting them to the scapula, was a large mass of malignant disease. The deltoid muscle had been previously absorbed by the disease for which the resection was performed. There seems to have been a nearer approach to the reproduction of the elbow joint, than any of the other joints, by the formation of new bone, cartilage, ligaments, and new attachments of the muscles.

TEXTER, after "a preliminary" examination of his case, positively asserted that there was a new formation of bone, and to the extent necessary to produce a perfectly new articulation of the ends of the bones.

Upon dissection he found "a lengthening of the ulna to the extent of a quarter of an inch, on which the radius moved, as in the natural state, and the trochlea of the humerus appeared as perfect as if none of it had been taken away."

ROUX found the lower end of the humerus rounded off, smooth, and as it were encrusted (*enroulée*) by cartilage. The upper end of the ulna was in the same condition.

In Mr. Syme's case reported in the *Lancet* of 1855, the man, thirty-eight years of age, when asked, said he knew no difference

between the limb operated upon and the other arm—flexion, extension, pronation and supination were as perfect as could be desired. His death was the result of an accident.

The following is Mr. Syme's description of the specimen : "The elbow has a very remarkable appearance ; the ends of the bones concerned, though quite different in shape from the normal condition, being yet so adapted to each other as to form a secure hinge-joint. The ulna is devoid of either olecranon or coronoid process, and, instead of embracing the end of the humerus, is received, along with the radius, into the forked end of the os-humeri. This form of the last-named bone appears to have been produced by the growth downwards of two processes, one from each side of the cut-end of the humerus, which appear to be entirely new formations. The ulna is separated a short distance from the humerus, the interval being occupied by a rather lax and vascular ligamentous union ; but the radius forms with the humerus a true articulation, lubricated with synovia ; the surface of the radius, where it touches the humerus, is rounded, the corresponding concave part of the humerus fitting accurately to it ; these surfaces are in part covered with fibro-cartilage, and partly bare, and of porcellaneous hardness ; but it is interesting to observe that a bare part of one bone is always opposed by a cushion of fibro-cartilage on the other. The radius and ulna are also adapted to each other : the tuberosity of the radius, into which the tendon of the biceps is inserted, being received into a cavity in the ulna, formed in part by a growth of the latter bone upwards into a process that curves over the rounded head of the radius, and gives attachment both in front and behind to a strong and distinct orbicular ligament, which is but loosely connected with the radius, and allows of its free play in rotation. To compensate for the loss of the head of the radius, which was removed in the operation, a prominent lip has grown out around the upper margin of the bone at its outer part, which thus has a purchase on the orbicular ligament, like the natural head. Be-

tween the radius and ulna there is partly loose ligamentous union, and partly a true articulation, lined with synovial membrane; the expanded insertion of the tendon of the biceps serving to cover the articulating part of the radius, while the depression on the ulna is lined with the nearest approach to pure cartilage that is to be found in this elbow. To the naked eye it looks quite like cartilage: and under the microscope differs from it only in the fact that the matrix is obscurely fibrous. Two strong lateral ligaments join the extremities of the processes of the humerus to the orbicular ligament on the one side and to the ulna on the other. A separate piece of bone (sesamoid) is imbedded in the internal lateral ligament at its junction with the ulna. The extremity of the prolongation of the ulna upwards is also a separate piece united to the rest by ligament. The anterior ligament of the joint has been cut away: it was extremely strong, so as to compensate for the absence of the olecranon in checking backward movement of the forearm beyond the limit of complete extension; it was attached above to the anterior surface of the humerus, and below to the upper edge of the orbicular ligament, and the anterior surface of the ulna. There was also a strong posterior ligament."

Mr. Wagner's experiments in resection of the extremities of bones in animals, were principally made upon rabbits, where he removed the head of the humerus, in order that he might bring the cut surface of bone opposite to an articular surface covered with cartilage. These experiments are so interesting, instructive and satisfactory, that I shall introduce the description of a few, as reported by himself.

In a full-grown rabbit, the head of the humerus was excised with a portion of the shaft; a piece nine lines long on the whole. Towards the end of the third week, it used this foot a little in running: and after this the usefulness of the limb increased up to its death. Before the animal was killed (fifty-four days after the operation,) the upper arm operated on was found to be about a quarter of an inch shorter than the other.

DISSECTION.—“The upper end of the humerus was felt through the soft parts rounded off like a ball, and freely moveable. After the soft parts were divided, a newly formed articular capsule was exposed, which passed off from the glenoid cavity, embraced the upper end of the humerus, and was inserted below its round end. This capsule contained a little pus. Its walls were on their inner surface a little rough, flocculent and turbid. The muscles which surrounded the joint were firmly united to the outer surface of the capsule. Even at a considerable distance from the capsule, they could not be separated from each other. The tendon of the biceps muscle was only loosely connected to the capsule, and ran on its posterior surface. The upper end of the resected humerus was seen as an irregular smooth ring of necrosed bone, about a line in depth. Below this, the hemispherical swelling was best marked. It extended about an inch and a half down the humerus, gradually thinning off. It was covered by periosteum, which was prolonged on to the unaltered part of the humerus below the swelling. On the outer side of the bone, two kinds of deposit could be distinguished. The one was snow-white, porous, tolerably soft, began as a thin layer, gradually increasing as it was traced upwards, and lay immediately upon the bone. The second kind of deposit was brownish yellow; it was situated over the substance above mentioned, and was in immediate connection with the capsule. It had not the same limits as the material which was deposited immediately around the bone, and was strongest on the side on which that material was the weakest; on that side it formed a cavity for a depot of inspissated pus; a few roundish white masses of bone, some of them separate, some joined together, were scattered about in this deposit; and these had precisely the same properties as the material which lay upon the bone. Beneath the free surface of the section of the humerus, the medullary cavity was filled with pus for the space of about a line in thickness, which was inseparably adherent to the old bone. This deposit was continued for a few lines further downwards upon the walls of the medullary cavity.

On micoscopical examination, the yellowish soft deposit and the new articular capsule, were seen to consist of fibrous tissue ; the white masses of normal bone.

The articular cartilage of the glenoid cavity was turbid, of a yellowish brown color, and separated from the edges of the articular surface. On microscopical examination, the appearances of softening already described, were seen in superficial layers, and in those lying nearest to its circumference. In the deeper layers of its central substance, it was distinguished from healthy cartilage, only by a finely granulated turbidity of the intercellular substance, by an increase in the size of the cells, and by a copious deposit of vesicles and granules of fat in them. No changes were seen in the scapula."

On a full-grown rabbit, the head of the humerus, three lines in thickness was excised. A splinter obliquely broken by the saw, was cut through with the bone nippers. The muscles were left covering the remainder of the shaft of the humerus, up to the same surface. No shortening of the limb, either immediately upon the operation or afterwards. As early as fourteen days after the operation, the animal ran about, and used the leg operated upon, almost as well as the healthy one. It merely trailed it a little. The animal was killed thirty-eight days after the operation.

DISSECTION.—“The wound was perfectly healed ; the cicatrix in the skin was closely united to the soft parts, which lay below it. The humerus was firmly attached to the scapula, but freely moveable. A short, thin, newly formed articular capsule had been developed, which proceeded from the edge of the glenoid cavity, and was inserted on to the upper edge of the divided humerus. The muscles surrounding the joint were firmly united with this capsule ; at a short distance from the capsule, they could be easily separated from each other ; they were firmly united to the edges of the section of the bone, through the medium of this capsule. The tendon of the biceps muscle was unin-

jured, and ran on the posterior surface of the capsule, loosely united to it, but pretty freely moveable. Inside the capsule was found a serous, somewhat ropy, fluid, which showed under the microscope fat-vesicles of different sizes, small granular bodies, and epithelial cells. The inner surface of the capsule was smooth, and covered by a layer of pavement epithelium, which, together with the capsule, also covered the upper end of the humerus. On the external surface of the humerus, (which was entirely covered by periosteum) an external thin layer of white, porous, bony substance had been deposited, passing downwards on one side for about two lines, on the other for about six, from the surface of the section of the humerus, and covering the free edges of a portion of that section for a short distance. The medullary cavity was closed for the space of half a line, by a firm, rather rough, plate of bone, which was firmly united to the walls of the medullary cavity, and the covering across the latter, derived from the articular capsule. The glenoid cavity was completely covered by healthy cartilage, nor was the scapula altered in any other respect. The lungs and heart were healthy."

In a large full-grown rabbit, the right *caput humeri* was excised with a portion of the shaft, a piece, nine lines in length being removed. At the end of the twelfth week, the wound was firmly cicatrized, and no trace of swelling remained around it. A new head could be felt through the soft parts, united to the scapula, but with perfect freedom of motion. The animal ran perfectly well, both in quiet motion and when chased, using the fore-leg operated upon, as much as the uninjured one. It was killed on the ninety-first day after the operation.

DISSECTION.—"The cicatrix was united to an articular capsule lying beneath it. This came off from the edges of the glenoid cavity, and was inserted about three lines below the upper extremity of the humerus, which was expanded into something of a club-shape. The capsule was perfectly closed. The

muscles surrounding the situation of the joint, were firmly united to the outer surface of the capsule, while at a little distance from it they were readily separable from each other. Over the anterior surface of the capsule, the thin remains of the deltoid muscle were to be traced, and they had a common insertion, together with the capsule, into the humerus. The anterior and upper part of the biceps muscle, which lay nearest the bone, and the upper end of the short head of the biceps, were firmly inserted into the bone, together with the lower and anterior edge of the capsule. The tendon of the long head of the biceps muscle ran in a fold of the capsule, which was smooth on its interior, and situated on the posterior surface of the latter, between two tubercles on the clubbed extremity of the humerus, which was enclosed in the capsule. It was quite freely moveable. The interior of the capsule was smooth, and its walls were covered with a layer of pavement epithelium. I failed to discover any epithelium on the fold of capsule, for the reception of the long tendon of the biceps. In the capsule was contained a rather thin,ropy, reddish-yellow fluid, which showed under the microscope epithelial cells, fat-vesicles, and dark, granular bodies. The cartilaginous covering of the glenoid cavity remained entire, nor was there any other alteration perceptible on the scapula. The humerus was covered with healthy periosteum, thickened over its upper extremity, which appeared to be connected with the capsule at its insertion, and was continued into the capsule, over the portion of the humerus, which was enclosed in it. The upper surface of the bone was covered by a thin layer of cellular tissue, which passed over at the edge, into the periosteum. This cellular tissue was more opaque and not so smooth as the inner surface of the lateral walls of the capsule, and not covered with epithelium. Underneath the periosteum, a layer of new bony material was deposited, which was hardly distinguishable from the original bone, and which was thin at its commencement, and became thicker in proceeding from below upwards. It closed the upper end of the medullary cavity perfectly, with a

thin lamella. The walls of the remainder of the old bone, as might be seen on section, passed gradually into this material, and were indistinguishable from it, as was also a deposit of bone on the walls of the medullary cavity. A thin layer of compact tissue surrounded the internal layer of the new bony material, which was developed into fully formed diploë. The whole of the medullary cavity was filled up with medulla, which was perfectly normal. The viscera of the animal were healthy."

He extirpated the radius in six pigeons, without preserving the periosteum. The wounds all closed by first intention, and upon unloosing the wings, at the end of from three to six weeks, the birds flew perfectly well.

In no case was there formation of new bony tissue; but in the place of the lost bone, was a thin cord-like fibrous material.

In all these cases it was impossible to retain a splint or any kind of apparatus upon the limb, or keep the animal quiet; so that the after treatment was much less under the control of the surgeon, than it would be, where the operation is performed upon a human being, it is therefore fair to suppose that the results present the most unfavorable side of the picture, so far as treatment goes. They always languished and drooped while confined in a dark room, but revived upon being brought to the light.

WAGNER favors leaving the wound open to allow free escape to the fluids, the patient suffers less and it diminishes the danger of infiltration of pus; he does not approve of union by first intention, neither does he think it of any advantage in the final result, as the swelling of the parts subsides, the muscles contract and form, by taking an insertion around the articular surface that has not been removed, and into the resected bone, below the level of the section, a firm capsule, which as the wound unites becomes a closed one.

Granulations shoot up from the inner wall of this capsule which if arranged in a thin layer, form a membrane covering the

inner surface of the capsule. If the whole cavity has been filled by granulation, they form a solid tissue, uniting the cut end of the bone to the articular cartilage.

The after condition of the parts, depends in a great measure, upon the manner in which the operation is performed ; if the bone be separated from the muscles a good deal beyond the part at which it is sawn through, and if the periosteum be preserved on the portion denuded of muscles, but not removed, the head of the bone is enclosed in a capsule ; if on the contrary ; the bone is removed just at the part down to which the muscles have been separated, or if the piece of bone which has been exposed below the level of the section has been deprived of periosteum, and in consequence is attacked with necrosis and exfoliation, the new capsule united by its lower edge with the upper end of the bone. He never has found a separate synovial membrane, such as Steinlen described, which could be dissected off the capsule, although the fluid contained in this capsule, is serous, yellowish, slightly turbid, and stringy. It having been asserted that the long head of the biceps muscle, sloughs, or is removed by the suppuration, he has never known such separation or sloughing in any case, and is very positive in recommending the preservation of the tendon in the operation.

With reference to the changes in the bones, the new deposite may be through ossification of the newly deposited cartilage or cellular tissue, the immature cellular tissue is gradually developed into perfect cellular tissue : being blended into one mass, with the periosteum, where the cartilage ossifies, the new bone is enveloped by the thickened periosteum. As early as the sixth day a thin ring of bone on the side of the medullary cavity gradually enlarges to occlude that cavity by means of a plate of bone, the upper ring of bone becomes eventually necrosed and is thrown off, or its peripheral layers are exfoliated, leaving a completely closed end of bone carefully rounded off.

The loss of substance is not restored by new formation of bone,

but is rather decreased by the necrosis and exfoliation ; with the occasional exception where the upper section of the bone is necrosed throughout, when new bone encircles it, having no connexion with the dead bone.

The newly formed bone, surrounds and encloses the walls of the old bone. Later it becomes more compact ; when absorption occurs in it, as well as the portion of old bone which it encloses, at length the old bone becomes rough, perforated, and gradually disappears. This new articular extremity of the bone, is attached to the surrounding parts through the muscles, which in place of being inserted into the bone, form their attachment by means of the new articular capsule. The end of the bone is covered by a layer of fibrous tissue ; connected at its edges only, with the new capsule, or on its whole surface, by a solid cord, extending from the new bone to the opposite articular surface.

The changes which take place in the articular cartilage and uninjured joint surface opposite the amputated extremity, are very important, as will be perceived, depending upon the degree of inflammation following the operation, where it was slight, the parts were but little changed, whereas acute inflammation caused their destruction, and exfoliation of the denuded bone, in the latter case granulations began to shoot up from its surface, even during the process of exfoliation to "unite with those which proceed from the soft parts, and thus either occasion the union of the solid fibrous uniting medium with the articular cavity in its whole extent, or, if a new capsule has been formed, embracing the edges of the articular surface."

We have thus far been studying diseases of the joints, acute in character, attacking young and strumous persons, soon destroying the joint, and involving the surrounding tissues to a greater or less extent. Of late years there has been much attention drawn to the investigation of a disease making its appearance in advanced age, and appearing in all the joints, but with a decided predilection for the larger articulations.

From its more frequently appearing in advanced life, and when attacking the hip joint, it has received the name of "Morbus Coxæ Senilis." Mr. Adams of Dublin in his recent work upon Rheumatic Gout has substituted "Chronic Rheumatic Arthritis," from its resemblance to a disease affecting other articulations and identical in its nature.

The exciting causes of this malady are still cloaked in obscurity: sometimes it is attributed to cold or wet. Mr. Adams thinks he has traced it to falls upon the trochanter. Its symptoms in the early stages are as follows: The patient complains of pain in the hip joint and parts adjacent, and of a dull, boring pain which frequently extends down the front of the thigh as far as the knee, or external condyle of the femur. The stiffness is most felt in the morning, upon first using the joint after the night's rest; after a little exercise the movements of the joint become more free, and the pain in the joint is diminished. Should the patient walk very much during the day the pain is always greater in the evening; which usually subsides upon retiring to rest. When the weight of the body is thrown upon the affected limb, the pain in the joint is always increased; but if pressure is made upon the great trochanter, or even a sharp blow struck upon the sole of the foot, it is attended with none, or very little inconvenience to the patient. Flexion and extension of the thigh upon the pelvis is limited: all movements of the joint being attended with a distinct crepitus. As in Morbus Coxarius, there is apparent shortening of the limb, of from one to three inches, really, consequent upon the obliquity of the pelvis. This chronic affection of the hip joint is rarely attended with heat, or external swelling of the soft parts, never resulting in suppuration.

DRS. COLLES AND TODD, look upon the disease, rather as one of irritation than chronic inflammation—whilst HAGGARTH, CRUVEILHIER, BRODIE and ADAMS think it sub-inflammatory or chronic. Be it a disease of irritation, or be it inflammation, it certainly is very slow in its progress, as exemplified in Patrick

Macken, who at seventy-one years of age had been disabled for seventeen years, from a severe pain in his right hip, attended with lameness which has been steadily increasing since the first appearance of the pain.

The changes in the tissues of the joint are exceedingly interesting. In the early stage, the capsule will be found thickened and distended with a preternatural quantity of synovial fluid ; the synovial membrane thickened and vascular. As the disease advances the fluid is absorbed, with destruction of the round ligament. Soon the interarticular fibro-cartilages are destroyed, to be supplied by an enamel, covering the articular surface of the bones, remarkable for its polish and hardness ; in the hip-joint the surface of the head of the femur, becoming in whole or in part as smooth as an ivory ball. The knee and elbow-joints are supplied with this porcelain-like enamel, deposited in parallel grooves in the direction of flexion and extension.

Under this peculiar morbid process, the bone, deprived of its covering of cartilage of incrustation, and constantly subject to friction, becomes polished, partially worn away or flattened and sometimes suffers from interstitial absorption. Upon these points the disease interests us, as indicating the course of treatment to be pursued. The pathology in all its stages is sufficiently well understood, to perceive that it gradually advanced under the motion and attrition of the two opposing surfaces of the bones entering into the structure of the joint, and that perfect rest is attended with the danger of great rigidity, if not ankylosis.

Under these circumstances, the treatment is fairly indicated to be motion, at the same time that the two opposite articulating surfaces are relieved from friction upon each other ; both of which indications can now be easily accomplished.

Mr. PRICE of the Infirmary of Serofulous Children, at Margate, has recently published some very interesting statistics of operations upon the hip-joint for hip-joint disease, and their result.

There were fourteen cases where the integrity of the joint was

more or less destroyed, either femoral, pelvic, or both : no dislocation, or rupture of the capsular ligament having occurred—of these, eleven recovered with more or less useful limbs, or were on the high-road to recovery.

In sixteen cases operated upon, where the diseased head of the os femoris was dislocated from its acetabular connexions, and no disease of the pelvis apparently existed—ten were perfectly successful—of the remaining six, three were successful, so far as the immediate result of the operation was concerned, the patients living from a few months to two years.

When the disease was more or less confined to the synovial and cartilaginous structures about the joint; and if the bony portions of the joint were involved, it was neither of the nature of caries or necrosis, there were five operations. Three were completely cured ; one died fifteen months after, from causes apart from disease of the hip, and the fifth died on the twentieth day, from increased debility and irritation.

Eighteen patients were operated upon, where the diseased head of the femur was dislocated from the acetabulum, and more or less disease of the acetabular portion of the pelvis existed. Of the number, only six recovered.

He shewed that the whole acetabulum could be removed and the patient recover. Mr. Erichson reports one case where he removed the head of the os femoris, the entire Acetabulum, a portion of the crest of the ilium, and the tuberosity of the ischium. The patient perfectly recovered. It will be perceived, that the most successful cases were those, where the condition of the joint was found to be almost exactly the same, as in the patient whose case is here reported—the character of the joint destroyed, the capsular ligament not ruptured, and the head of the femur remaining in its natural cavity. He does not mention whether there was diseased bone or not, if there was, it must have been limited, without having caused much irritation to the surrounding parts : and probably the vital energies of the patients were not impaired.

When the disease had destroyed the capsular ligament, with dislocation of the head of the bone, the result was very favorable, but not so encouraging, as where the previous condition of the parts existed. After the disease had extended to the innominate and os femoris with dislocation, the result was not encouraging. In the latter cases, it strikes me, that finding the disease so far advanced, it would be better to amputate at the hip-joint, leaving the wound open, to facilitate recovery by affording a more ready escape to the pus, and dead bone in the process of ~~exfoliation~~, thus allowing the parts as they become healthy, to granulate and close the stump. By this procedure, the patient would be relieved of a limb, which, in this critical state of things is a very troublesome member, confining him to one position, and embarrassing his movements; all of which must increase his sufferings, and add to the constitutional irritation of a system already greatly reduced by disease.

The physical condition of patients suffering from hip-joint disease, is another point worthy of consideration—most frequently it occurs in those of a strumous diathesis.

When we examine our patient, with reference to an operation, a more thorough sifting of his or her condition is imperative—remembering that the greatest safety is in searching more closely, for those conditions which forbid an operation, rather than magnifying the favorable indications. Satisfied that the local disease is not too far advanced, and that the patient's strength is sufficient to bear the operation, it is still important, that the condition of every organ and function should undergo a thorough investigation. I have been surprised by the large number of cases in which Brights' disease was found to exist after death, to which, of course the fatal result was attributed. The heart, lungs, and in fact every part of the body seem prone to take on diseased action upon the slightest provocation, and I think it a safe conclusion to arrive at --that this operation should only, be resorted to, after being thoroughly satisfied, that no other means can arrest the onward progress of the disease.

ENCHONDROMA,

OR,

CARTILAGINOUS TUMORS.

JAMES A. COVILL, fourteen years of age, born in the United States, has suffered with the above disease since early childhood.

At fourteen months of age, the second finger of his left hand was caught in a door—the physician who saw him told his mother that the finger was broken, and treated it as a fracture. The mother says the swelling never entirely disappeared.

Eighteen months after receiving the injury, a decided tumor made its appearance on the second phalanx of the finger, at the point of fracture—the first phalanx of the same finger simultaneously began to swell throughout its whole extent. These changes began without any apparent exciting cause, with but little pain and no constitutional derangement. Soon after, another tumor appeared upon the metacarpal bone of the index-finger near the meta-carpal-phalangeal articulation and on the dorsal surface. The disease continued to advance from the first phalanx of the second finger, until the motion of the joint became impeded, and the second metacarpal bone extensively involved.

I am thus particular in describing the appearance and progress of the tumors, in order to show that the disease did not appear in, or involve the cartilages of the joints during the early stage of its progress.

Between the age of four and five years he had Typhus Fever, when the large tumor upon the second finger began to enlarge,

and he looks upon that as the period from which to date the rapid increase in the size of the lumps and spread of the disease.

At seven years of age he fell upon the ice and a companion accidentally stepped upon the hand—the whole hand was severely contused, but he does not think the advance of the disease was accelerated by the injury. Two years after, the largest lump began to grow, and in May, 1854 the integuments to the size of a quarter of a dollar sloughed from the tumor next to the largest in size, followed by copious suppuration, leaving a cavity one inch in depth, which soon filled up, to be covered by a firm cicatrix. At that time he consulted an herb doctor, who treated it by repeated sweating with his sovereign remedies: which made their success most apparent, by a rapid increase of the disease. He now suffered more pain than formerly, but of a dead heavy character, apparently as much owing to the size of the hand, and probably more than from the character of the disease, yet the discomfort was so great as to make him willing and desirous to have the hand removed.

August 25th, 1854. The patient being under the influence of chloroform I removed the hand at the wrist joint, by the double flap method: after securing the arteries, the flaps were brought together without disturbing the synovial surface, or removing any portion of the radius or ulna, the parts united promptly with but slight inflammation or suppuration, so that the whole was well in two weeks. Four months after the operation, he has a good stump, no pain, and his general health is perfect.

The plate, from a drawing by my friend Dr. Jno. W. Green, represents the appearance of the specimen soon after its removal. The integuments and loose cellular tissue having been removed by dissection.

Professor J. C. Dalton was kind enough to examine a portion of the tumor under the microscope, which he found to "consist simply of cartilage in process of partial ossification—most of it was pure cartilage, but there were ~~specula~~ of bone project-

ing into it in various directions. There were no other elements than these to be found." The Cartilaginous deposits as he delineated them, had precisely the same appearance of the nuclei as represented by Mr. Paget, in his work on *Surgical Pathology*, at page 425.

Enchondroma was first used by Müller to designate a growth, sometimes named Osteo-chondroma or Benign Osteo-sarcoma. Mr. Paget objects to the last name as being vague, and it has the additional objection of conveying the impression that it is to a certain degree a malignant growth. Mr. Paget has been so successful in his classification of tumors, that I doubt not the class of Cartilaginous tumors of which this is a specimen, will, in future receive the distinctive title of Cartilaginous tumors or Enchondroma.

This disease is accurately described by Mr. Miller in his *Principles of Surgery*, as being connected with bone, peculiar to early years and usually attributable to external injury. The growth, slow and painless, most frequently found in the metacarpal bones and phalanges of fingers. The articulating cartilages are not involved, but form the limits of the growth in that direction; and adjacent tumors have no tendency to coalesce. Before entering upon the subject in general, let us look at the class of which this specimen is such a perfect type.

This growth is strictly benign, beginning within the bone, and so far as we can learn, invariably confined to childhood, appearing often before birth, but never after puberty. There are about fifty cases now recorded of this malady, all developed before the age of fifteen—in none was there any appearance of malignant disease, although it has reappeared after removal; as in Mr. Salmon's case, of which, before dissection this specimen was a perfect copy, his being the right hand, this the left. Mr. Paget gives a sketch of it in his work and speaks of it as being the most remarkable yet seen, having been removed from a man fifty-six years of age, from whom, when he was sixteen

years old, the forefinger of the left hand was amputated—the little finger of the same hand having a tumor as large as a walnut; he has irregular nodules on his left tibia, and some enlargement exists at his second toe of the same side.

There is little or no tendency to degeneration, even when after many years duration, ulceration of the investing integuments may have occurred—the surrounding textures are not involved but pushed aside. Although attacking all parts of the skeleton, it is most frequently found in the metacarpal bones and phalanges of the fingers, yet the articulating cartilages never are involved in the disease, but form a limit to the growth, necessitating the formation of a number of tumors on one hand, which, whatever may be their tendency, by this cut off are barred from coalescing. The growth is painless and usually slow, except aroused to action by some exciting cause, as a blow or irritating applications—the latter frequently causing the integuments to slough; and where several tumors are developed simultaneously they are the result, not of a constitutionally malignant cause, but rather of "the widely spread influence of the exciting cause, which in most instances is a contusion."* Nearly all the phalanges and metacarpal bones of one or both hands may be simultaneously attacked by this growth, frequently projecting from only one side of a bone, expanding into irregularly round, smooth and oval masses, elongating the fingers, and interfering with or totally preventing the movements of the joints.

From this growth beginning within the bone, the medullary cavity of a metacarpal bone can be filled with cartilage, without changing the external appearance, consequently the surgeon may amputate the finger where it has expanded into a tumor, leaving the disease above to reappear, as in the boy operated upon by Dr. Lawrence, who did not suppose the metacarpal

* Müller.

bones or the second phalanges affected by the disease, until the operation was being performed, when their medullary cavities were found to be filled with cartilage.

We also have the cartilagenous tumor appearing upon the fingers external to the bone, between the bone and periosteum, but these are usually isolated tumors and may be removed without injury to the shaft. When this disease appears in other parts of the body, it takes upon itself new characters and new complications. It may appear in three distinct structures, in the medullary cavity or within the bone; external to, or between the bone and periosteum; and among the soft tissues, more frequently found in the region of the parotid gland.

1st. The adventitious growth is developed in the interior of the bone. The deposite gradually takes place in the cancellous texture when the external denser portion, or shell, is proportionally dilated. This outer covering, though attenuated by the disease, would be unable to envelope the growth as it does, except, that nature from time to time supplies additional osseous matter, for a long time maintaining its continuity. Gradually the bony covering becomes thinner, until at points it is wholly destroyed, although retaining their smoothness and spherical shape, in many cases to the touch, they become so elastic as to convey the impression that they contain fluid: having frequently been punctured, and in one case to my knowledge, greatly reduced the patient by the hemorrhage.

2d. The second variety is formed on the external surface of the bone, covered only by the periosteum and other soft parts. It is generally met with in flat bones; the cranium, pelvis or ribs; the form is less regularly spheroidal, and the surface more unequal, than in those originating within the bone. They are generally fastened to the natural surface by outgrowths of new bone. This ossification beginning on the surface of the bone forms an expanded base from which to extend into the substance of the cartilage, even so far as to have changed the whole car-

tilaginous mass into bone. But these attachments vary as to size, sometimes not being larger than a pipe-stem.

3d. Lastly it may appear among the soft tissues, more frequently found in the region of the parotid gland, but met with pure or mixed, in the testicle, mammary gland, subcutaneous tissue, lungs and soft parts near bones.*

These may be composed of cartilage only, but a large proportion contain fibrous cartilage mixed with other tissues; either wholly surrounded by the gland, or included in its substance.

“Bennet upon Cancerous and Canceroid growths,” at page 108, gives the history of a tumor affecting the humerus of a girl fourteen years of age, and remarks, that true cancer of the bone and enchondroma, so called medullary sarcoma, as in the present case, so closely resemble each other to the naked eye, that they always have been confounded. Again at page 112, is described a case of this disease involving the Ischium and Pubis, where the patient died without an operation and the disease was supposed to be cancer: more careful scrutiny, however, detected peculiarities which threw doubt upon this conclusion, and consequently he was induced to investigate the growth more thoroughly. “Sections with Valentine’s knife soon proved that the tumor was really cartilagenous, softened in some places and closely resembling cancer.” He also mentioned a tumor occurring in the parotid region, fibro-cartilaginous in its character. He suggests that we may possibly find it in other growths and with true cancer.

Many physicians in the City of New York will probably remember two strikingly similar cases to those given by Mr. Bennet—one of a young girl in the New York Hospital, who died from exhaustion, of an immense tumor beginning in the humerus, smooth and round, with that elasticity which is so

* Müller.

often mistaken for an accumulation of fluid or pus ; it also ulcerated, but the part was soon covered by a firm cicatrix. I remember at the post-mortem being struck, with its light pinkish, jelly-like appearance ; and the knife passed through it with that peculiar crispy sensation, which you experience in cutting cartilaginous tumors.

The other was the "bony tumor, arising from the pelvis," removed by Dr. J. Kearney Rodgers, the history of which, he published in the New York Journal of July, 1839. "This tumor was firmly united by bone to the body and ramus of the pubis, the cancellated structure of which was enlarged, * * * * but did not project into the cavity of the pelvis." The patient died from the shock to the nervous system, the operation having been very severe and protracted, owing to the size of the tumor. He asks if the disease was of a malignant character ?

From the description, this tumor resembles those spoken of as beginning cartilaginous, and as they advance, becoming bony—with the knowledge acquired by the modern pathological and microscopical investigations of such men as Rokitansky, Müller, Paget, and Vichow, I think we would be justified in giving a favorable prognosis in a similar case, provided the operation was performed before the tumor had attained such an enormous growth.

These tumors of the hand appearing at an early age, are sufficiently characteristic to be easily recognized ; at all events there is not so much danger of confounding them with malignant disease, as where they occur in other parts of the body, upon persons further advanced in life. When we come in contact with these abnormal growths they almost invariably present some point of obscurity, or uncertainty, clouded by anxiety as to their component parts. But these doubts are usually cleared up upon the removal of the mass, if not, the all pervading eye of an intelligent microscopist, will determine whether the disease be benign or malign. Here it is that the Charlatan

plays upon the credulity of his innocent victim—by a tedious and painful process, destroying an innocent tumor, which, under the influence of chloroform, might have been removed without pain, and in a few moments, by the hands of a skillful surgeon. But the evil working of these men does not cease here, they persuade their dupe that their skill has removed a cancer, never to return, owing to the remedies employed. Alarmed by this deception, the patient hastens to his or her relations to announce that in their family a cancer has taken root, the seeds of which are to be feared through every succeeding generation, whereas, only a harmless mass of disease has been removed without the slightest trace of cancer in it.

Where this disease appears in other parts of the body than the hands and feet, it is not so well marked, and consequently not so easily distinguished from other outgrowths. In such cases it does not necessarily make its first appearance in childhood, on the contrary, appearing at all periods, from early youth to advanced age. According to the above authors it is met with as pure cartilage—cartilage in the process of ossification, and the recurring cartilaginous tumor. Then we find it mixed with malignant disease, glandular tissue, imbedded in the fibro-cystic tumor of the testicle, fibro-recurrent and myeloid tumors. “Such combinations are not, I believe, imitated in the cases of any other structures found in tumors, even those that are thus combined with cartilage do not, I think, combine with one another, if we except the cases of intra-uterine morbid growths. As yet, however, the interest that belongs to all these inquiries is scarcely more than the interest of mystery and of promise to future investigation.”*

* Paget.

ERRATA.

9th page, 12th line, femor	should read femur.
11th " 10th "	pereosteum, should read periosteum.
11th " 24th "	an " " and.
17th " 31st "	encusted " " encrusted.
23d " 21st "	cartalaginous " " cartilaginous.
30th " 10th "	expolliation " " exfoliation.
82d " last "	spiculace " " spiculae.

